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REMARKSSpecification Amendments

These amendments correct typographical errors in the typing of the preferable range of tin in the original text at line 23, on page 3. The preferable range as correctly typed is "0.055% to about 0.095%" as indicated in the specification amendment presented herewith. No new matter is involved since it's an obvious error, the preferable range necessarily being within the "0.05% to about 0.10%" range previously discussed.

Claim Amendments

Applicant has cancelled non-elected claims 6-8, without prejudice to the right to pursue the patentability of their subject matter in a continuation application.

Request for Reconsideration

Applicant's claimed invention comprises a method for the casting of internal combustion engine parts, such as crankcases and cylinder heads, with grey cast iron. Applicant respectfully submits that the combination of steps comprising Applicant's claimed method is not disclosed, taught or suggested by the cited references, and respectfully requests the Examiner to reconsider his rejection of Applicant's claims. Applicant respectfully submits that the subject matters of claims 1-5 and 9-14 were not obvious over Tache's U.S. Patent No. 3,299,482, in view of Bostater et al.'s U.S. Patent No. 4,493,359.

Tache's invention was concerned with the problem of high incidences of bore wear and oil consumption because the castings produced with the composition set forth at Col. 2, lines 16-23, included bores that were quite soft, as low as 110 Brinnell, with a microstructure unsuitable for the type of service to which the castings were to be subjected. (See Col. 2, lines 26-32). Tache indicated that the problem of soft blocks was the result of shut-downs of the foundry molding and cooling line conveyors, such as for lunch hour, shift changes or night stoppages, and other unforeseeable reasons, resulting in the castings being retained in the molds for extended periods, which permitted the bores to self-anneal because of their low cooling rate through the secondary graphitizing range from approximately 1450°F to 1200°F. (See Col. 2, lines 38-48). Tache's disclosed solution to this problem was to add tin in certain critical

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quantities in the range of 0.04% to 0.10% to the grey iron composition that had been in use, resulting in the casting composition disclosed at Col. 3, lines 40-49.

Bostater et al. were concerned with scrap losses, as high as 25% that accompanied the casting of engine blocks with thin wall thicknesses of about 0.150 inches in order to reduce engine weight and increase fuel economy. Bostater et al. state that their invention solves this problem, and that "A cardinal feature of the method of the present invention is that after the molten grey metal is made it is held at substantially constant temperature for a period of from one and one-half to two and one-half hours prior to being poured into the mold." (Col. 2, lines 48-53). Bostater et al. state:

"The metal formulation can be any of those well known in the art for machinable grey cast iron, preferably having a chemistry as poured, which includes, by weight, from 3.30% to 3.60% C; from 2.10% to 2.65% Si, from 0.05% to 0.09% P, from 0.50% to 0.70% Mn, from 0.15% to 0.25% Cr, from 0.10% to 0.15% Ni, and from 0.15% to 0.25% Cu, 0.15% maximum S, and the balance Fe. A typical chemistry for the practice of the invention is the following, in weight percent:

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C	3.48%
Si	2.30%
P	.07%
Mn	.61%
Cr	.19%
Ni	.12%
Cu	.21%
S	.15% maximum
Fe	remainder

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(Col. 3, line 52-Col. 4, line 3).

Such molten grey metal was maintained at a substantially constant temperature for a period of one and one-half to two and one-half hours with "the use of a holding furnace of massively increased capacity, as compared with the holding furnaces heretofore used." (Col. 2, lines 52-56).

One of ordinary skill in the art would not combine the teachings of Bostater et al. with those of Tache in an effort to solve the problems solved by Applicant's invention. Mr. Ward states in paragraph 6 of his Declaration,

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"I do not believe the combined teachings of the Tache patent and the Bostater et al. patent teach our casting method. The combined teachings of the Tache and Bostater et al. patents do not teach a casting method in which molten grey iron with very low levels of carbide stabilizers and a low level of tin is inoculated with silicon to a level of about 0.10% to about 0.12%, is poured as soon as possible after inoculation, and in which the resulting castings are removed from their molds at over 1400°F. Furthermore, I do not believe a skilled metallurgist trying to develop castings with high strength, minimal iron carbide hard spots and chills, low residual stresses in reduced casting times, and without additional equipment, would combine the teachings of the Tache patent and the Bostater et al. patent, whose teachings are directed at different problems."

The teachings of Bostater et al. are contrary to Applicant's invention. As set forth in paragraph 3 of Mr. Ward's Declaration,

"... In our method, very low levels of carbide stabilizers, such as chromium and phosphorus, and a low level of tin, are used in molten grey iron casting metal, which is inoculated with silicon to a level of about 0.10% to about 0.12% while it is in the pouring ladle, and poured as soon as possible after inoculation, and the castings are shaken out while they are hot, in excess of 1400°F."

In this regard, Applicant's molten controlled-content grey iron metal includes less than about 0.3% phosphorus, base chromium less than 0.1% and tin, in a total tin content of about 0.05% to about 0.10% to provide the molten tin-alloyed controlled-content grey iron metal set forth in Applicant's claims. Contrary to Applicant's claimed phosphorus level of less than .03%, Bostater et al. discloses the use of phosphorus in the amount from 0.05% to 0.09%, and preferably 0.07%, well in excess of Applicant's claimed low level. In addition, in Applicant's method, the molten controlled-content grey iron metal comprised chromium less than about 0.10%. Contrary to this low level of chromium, Bostater et al. discloses the use of chromium from 0.15% to 0.25%, preferably 0.19%.

Moreover, Bostater et al. has no disclosure of the use of tin, while Applicant's molten tin-alloy controlled-content grey iron metal includes .05% to .010% tin. Additionally, Bostater et al. use nickel in the amount from 0.10% to 0.15%, and copper in the amount from 0.15% to 0.25%, while no such alloys were used in Applicant's method. Furthermore, Bostater et al. discloses that his alloy includes silicon in an amount from 2.1% to 2.65%, preferably 2.3%, while Applicant's molten controlled-content grey iron metal includes silicon of only about 1.80% to about 1.90%.

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Even, assuming *arguendo* Tache and Bostater et al. are combinable, their combined alloy teachings would include:

The alloy combination of Tache and Bostater et al.:	The alloy composition of applicant's claims:
2.1% Si, which is the percentage common to their alloys	About 1.80% to about 1.9% Si
0.05% to 0.09% P, preferably 0.07% P, which is the middle of the range taught by Tache	Less than about 0.03% P
0.15% Cr, which is the amount common to both Tache and Bostater et al.	Less than about 0.10% Cr
0.08% Sn and 0.15% N <sub>1</sub> and 0.15% to 0.2% Cu. There is nothing in Tache or Bostater et al. to teach that Bostater et al.'s N <sub>1</sub> and Cu can or should be omitted from any alloy combination of Tache and Bostater et al. or that 0.08% Sn and 0.15% N <sub>1</sub> , and 0.15% to 0.20% Cu are equivalent.	About 0.05% to about 0.10% Sn.

*Prima facie* obviousness is not established where, as here, the prior art references, even if combined as proposed by the Examiner, would result in combination containing concentrations far in excess of maximum concentrations defined in the claims. See *Ex Parte Sato*, 52 USPQ2d 1702, 1703 (Bd. Pat. App. & Inter. 1999, unpublished).

The Examiner, in his rejection, acknowledges that Tache does not disclose the step of adding further silicon as an inoculant to the molten grey iron alloy, and in paragraph 6(1) of the final action acknowledges that the exact amounts of each of the constituents as presently claimed are not disclosed in the prior art. The Examiner, however, indicates that it has been held that one of ordinary skill in the art would have considered the claimed compositions to be obvious because the overlapping of ranges in a composition of the prior art and a claimed composition, is considered to establish a *prima facie* case of obviousness, citing *In re Malagari, Titanium Metals v. Banner* and *In re Nehrenberg*.

However, the overlapping ranges referred to by the Examiner involve only a comparison of the alloy elements disclosed in Tache at col. 3, lines 40-50 with the alloy elements recited in Applicant's claims. Applicant's claimed invention includes more than the alloy elements recited in his claims, namely the combination of steps including "inoculating said molten tin-alloyed controlled-content grey iron metal with grey iron inoculants to a further silicon addition of about

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0.10% to about 0.12%" and "pouring said molten tin-alloyed inoculated controlled-content grey iron metal as soon as possible after said inoculation into a casting mold" and "shaking the resulting casting out of the casting mold while at a temperature over 1400°F" as in claim 1, and the combination of steps of "inoculating said molten tin-alloyed grey iron metal prior to pouring with a grey iron inoculants to a further silicon addition of from about 0.10% to about 0.12%", and "casting an internal combustion engine part as soon as possible after said inoculation" as in claim 9. Thus, the decisions cited by the Examiner at the end of paragraph 6(1) are not dispositive of the issue of *prima facie* obviousness of Applicant's claims.

"To establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art., *In re Royka*, 490 F.2d.981, 10 USPQ 580 (CCPA 1974). 'All words in a claim must be considered in judging the patentability of that claim against the prior art.' *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 474, 496 (CCPA 1970) . . ." (MPEP 2143.03, page 2100-128, Rev. 1 Feb. 2003.)

There is nothing in the Tache and Bostater et al. patents that disclose, teach or suggest Applicant's claimed combination of steps with Applicant's claimed molten tin-alloyed, controlled-content grey iron metal, which the Examiner acknowledges is not disclosed by the prior art. Furthermore, in combining Tache and Bostater et al., the Examiner cannot ignore Bostater et al's specific teachings and using Applicant's disclosure as a guide, pick those statements of Tache to support a rejection while ignoring inconsistent statements of Bostater et al. *In re Wesslau*, 147 USPQ 391,393 (CCPA, 1965), *Bausch & Lomb v. Barnes-Hind/Hydrocurve*, 230 USPQ 416 (CAFC, 1986). As set forth above, the combined teachings of Tache and Bostater et al. do not even teach the alloy used in Applicant's claimed method of claims 1 and 9.

In addition, clearly there is nothing in the cited references that discloses, suggests or teaches the subject matters of claims 3-5 and 11-13. There is nothing in the cited references that discloses a method wherein molten controlled-content grey iron metal is alloyed with tin in a percentage dependent upon an important section of the part being cast that is required to have the greatest strength and/or machinability, as in claims 3 and 11, and more particularly wherein the molten controlled-content grey iron metal is alloyed with tin at the high end of the percentage range for parts with an important section that cools slowly, as in claims 4 and 12, or wherein the

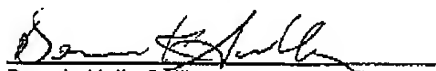
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molten controlled content grey iron metal is alloyed with tin at the low end of the percentage range for parts with an important section that cools quickly, as in claims 5 and 13.

Applicant respectfully requests reconsideration of the Examiner's rejection of Applicant's claims. As set forth above, Tache and Bostater et al. cannot be combined in a manner disclosing or rendering obvious Applicant's claimed invention.

Respectfully submitted,



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